

IMAGE PLAYBACK DEVICE AND METHOD AND ELECTRONIC CAMERA  
WITH IMAGE PLAYBACK FUNCTION

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the priority of Japanese Patent Application No. 08-339338 filed December 19, 1996, which is incorporated herein by reference.

This application is a continuation of Application No. 08/993,984 filed December 18, 1997 (abandoned).

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention concerns an image playback device which plays back moving-picture image information, and an electronic camera which has a moving-picture image information playback function. More specifically, the present invention concerns an image playback device and an electronic camera which can select or discard moving-picture image information according to prescribed set conditions, and which can play back and display such information only during certain limited periods.

RELATED BACKGROUND ART

In the past, image playback devices and electronic cameras which play back moving-picture image information

recorded on a recording medium have been adapted for practical use.

Especially in recent years, as a result of the development of digital image processing using computers, 5 etc., devices which play back image files that have been subjected to high-efficiency encoding such as the MPEG standard, etc., have become known.

In image playback devices of this type, when 10 instructions are given for the playback of a prescribed image file, the moving-picture image information contained in the image file is played back and displayed throughout a continuous time period.

However, unedited image files contain numerous 15 unnecessary playback images (hereafter referred to as "unnecessary locations"). Ordinarily, the operator runs the playback images at fast forward in order to skip over such unnecessary locations.

During such fast-forward operation, the operator must 20 confirm the end points of unnecessary locations visually, and must therefore constantly monitor fast-forward images which have poor visual recognition characteristics. As a result, fast-forward skipping of unnecessary locations is tedious and difficult.

Furthermore, it often happens that the operator will 25 not notice the end point of an unnecessary location, and will inadvertently continue fast-forward operation into important playback locations.

SUMMARY OF THE INVENTION

Accordingly, a first object of the invention is to provide an image playback device and method which make it possible to observe playback images while automatically skipping over unnecessary playback locations by discriminating time periods with specified conditions, and performing playback based on the results of this discrimination.

A second object of the invention is to provide an image playback device and method which allow direct playback of the contents of moving-picture image information (i. e., the flow of stories or conversations, etc.).

A third object of the invention is to provide an image playback device and method which make it possible to extract and playback the conversation of specified speakers, etc.

A fourth object of the invention is to provide an image playback device and method which make it possible to omit locations of faulty imaging caused by backlighting, etc.

A fifth object of the invention is to provide an image playback device and method which make it possible to discriminate between panning scenes and scenes other than panning scenes, and to play back scenes of one or the other type.

A sixth object of the invention is to provide an image playback device and method which make it possible to perform playback with locations in which the principal object of

imaging is absent (e.g., locations in which only a wall is imaged, etc.) being deliberately omitted.

A seventh object of the invention is to provide an image playback device and method which divide moving-picture image information into images from which persons are absent and images in which persons are present, and play back images of one or the other type.

An eighth object of the invention is to provide an electronic camera and operating method which allow (for example) observation with automatic skipping of specified playback locations by discriminating imaging parameters as conditions during imaging, and performing playback based on the results of this discrimination.

A ninth object of the invention is to provide an electronic camera and operating method which make it possible to perform playback with playback locations showing an out-of-focus state omitted.

A tenth object of the invention is to provide an electronic camera and operating method which make it possible to perform playback with locations imaged at a lens position at the point-blank end omitted.

An eleventh object of the invention is to provide an electronic camera and operating method which make it possible to divide moving-picture image information into scenery images, etc., and images other than scenery images, etc., and to play back images of one or the other type.

A twelfth object of the invention is to provide an electronic camera and operating method which allow (for example) observation with automatic skipping of specified playback locations by discriminating the surrounding environment as conditions during imaging, and performing playback based on the results of this discrimination.

A thirteenth object of the invention is to provide an electronic camera and operating method which make it possible to perform playback in which images of objects that have a specified surface temperature are extracted.

Briefly stated, in one of its broader aspects, the present invention comprises a medium playback means which reads out recorded information from a recording medium, a time period discriminating means which receives the recorded information read out by the image playback means and discriminates periods of time during which the recorded information agrees with at least one pre-set condition, and a playback display means which plays back and displays moving-picture image information contained in the recorded information in accordance with results of the discrimination performed by the time period discriminating means.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be further described in conjunction  
25 with the accompanying drawings, which illustrate preferred  
(best mode) embodiments and illustrative implementations,  
and the figures of which are briefly described hereinafter.

Figure 1 is a block diagram illustrating a first (general) embodiment of the invention.

Figure 2 is a block diagram illustrating a second embodiment.

5 Figure 3 is a block diagram illustrating a third embodiment.

Figure 4 is a block diagram illustrating a fourth embodiment.

10 Figure 5 is a block diagram illustrating a fifth embodiment.

Figure 6 is a block diagram illustrating a sixth embodiment.

Figure 7 is a block diagram illustrating a seventh embodiment.

15 Figure 8 is a block diagram illustrating an eighth embodiment.

Figure 9 is a block diagram illustrating a ninth embodiment.

20 Figure 10 is a block diagram illustrating a tenth embodiment.

Figure 11 is a block diagram illustrating a first illustrative implementation of the invention.

Figure 12 is a perspective view illustrating the external appearance of the first illustrative implementation 25 of the invention.

Figure 13 is a flow chart illustrating the operation of the first illustrative implementation of the invention.

Figure 14 is a block diagram illustrating a second illustrative implementation of the invention.

Figure 15 is a flow chart illustrating the operation of the second illustrative implementation of the invention.

5 Figure 16 is a block diagram of a third illustrative implementation of the invention.

Figure 17 is a flow chart illustrating the operation of the third illustrative implementation of the invention.

10 Figure 18 is a block diagram of a fourth illustrative implementation of the invention.

Figure 19 is a flow chart illustrating the operation of the fourth illustrative implementation of the invention.

Figure 20 is a block diagram of a fifth illustrative implementation of the invention.

15 Figure 21 is a flow chart illustrating the operation of the fifth illustrative implementation of the invention.

Figure 22 is a block diagram of a sixth illustrative implementation of the invention.

20 Figure 23 is a flow chart illustrating the operation of the sixth illustrative implementation of the invention.

Figure 24 is a block diagram of a seventh illustrative implementation of the invention.

25 Figures 25 and 26 are flow charts illustrating the operation of the seventh illustrative implementation of the invention.

Figure 27 is a block diagram of an eighth illustrative implementation of the invention.

Figure 28 is a flow chart illustrating the operation of the eighth illustrative implementation of the invention.

5 DESCRIPTION OF PREFERRED EMBODIMENTS  
AND ILLUSTRATIVE IMPLEMENTATIONS

Figure 1 is a block diagram which illustrates a first (general) embodiment of the invention.

The invention shown in Fig. 1 is characterized by the 10 fact that an image playback device is equipped with a medium playback means 1 which reads out recorded information that has been recorded on a recording medium R, a time period discriminating means 2 which receives the recorded information read out by the image playback means 1 and 15 discriminates periods of time during which the recorded information agrees with at least one pre-set condition, and a playback display means 3 which plays back and displays moving-picture image information contained in the recorded information in accordance with the results of the 20 discrimination performed by the time period discriminating means 2.

Figure 2 is a block diagram which illustrates a second embodiment invention.

The second embodiment is characterized by the fact that 25 in the image playback device of the first embodiment, a time period discriminating means 2 is equipped with a sound quantity detection means 4 which receives audio information from the recorded information read out by the medium

playback means 1, and detects the quantity of sound of this audio information, and a silence discriminating means 5 which discriminates silent periods in which the quantity of sound detected by the sound quantity detection means 4 drops 5 below a predetermined sound quantity, and by the fact that the playback display means 3 plays back and displays moving-picture image information contained in the recorded information only during time periods other than the silent periods discriminated by the silence discriminating means 5.

10 Figure 3 is a block diagram which illustrates the third embodiment of the invention.

The third embodiment is characterized by the fact that in the image playback device of the first embodiment, the time period discriminating means 2 is equipped with a 15 speaker characteristic feature extracting means 6 which receives audio information from the recorded information read out by the medium playback means 1, and detects at least one characteristic feature parameter specifying long-term spectrum averages or mean pitch frequencies for the 20 audio information; and a speaker discriminating means 7 which discriminates time periods during which the characteristic feature parameters detected by the speaker characteristic feature extracting means 6 show agreement with pre-registered characteristic feature parameters within 25 permissible ranges, and by the fact that the playback display means 3 plays back and displays moving-picture image information contained in the recorded information only

discriminating means 7.

Figure 4 is a block diagram of the fourth embodiment of the invention.

5 The fourth embodiment is characterized by the fact that  
in the image playback device of the first embodiment, the  
time period discriminating means 2 is equipped with a  
brightness difference detection means 8 which inputs moving-  
picture image information from the recorded information read  
10 out by the medium playback means 1, and detects differences  
in the brightness level between central and peripheral  
portions of an image screen, and a backlighting  
discriminating means 9 which discriminates periods of  
backlighting (in which imaging is performed under backlit  
15 conditions) based on the brightness level differences  
detected by the brightness difference detection means 8, and  
by the fact that the playback display means 3 plays back and  
displays moving-picture image information contained in the  
recorded information only during time periods other than the  
20 periods of backlighting discriminated by the backlighting  
discriminating means 9.

Figure 5 is a block diagram of a fifth embodiment of the invention.

The fifth embodiment is characterized by the fact that  
25 in the image playback device of the first embodiment, the  
time period discriminating means 2 is equipped with a  
movement detection means 10 which receives moving-picture

image information from the recorded information read out by the medium playback means 1, and detects movement vectors between moving-picture frames, and a panning discriminating means 11 which discriminates panning periods (in which the screen as a whole moves horizontally) from the movement vectors detected by the movement detection means 10, and by the fact that the playback display means 3 acquires the panning periods discriminated by the panning discriminating means 11, and plays back and displays moving-picture image information contained in the recorded information only during the panning periods or during time periods other than the panning periods.

Figure 6 is a block diagram of the sixth embodiment of the invention.

The sixth embodiment is characterized by the fact that in the image playback device of the first embodiment, the time period discriminating means 2 is equipped with a contrast detection means 12 which receives moving-picture image information from the recorded information read out by the medium playback means 1, and detects the contrast of this moving-picture image information, and a low-contrast discriminating means 13 which discriminates low-contrast periods in which the contrast detected by the contrast detection means 12 drops below a predetermined threshold value, and by the fact that the playback display means 3 plays back and displays moving-picture image information contained in the recorded information only during time

periods other than the low-contrast periods discriminated by the low-contrast discriminating means 13.

Figure 7 is a block diagram of the seventh embodiment of the invention.

5 The seventh embodiment is characterized by the fact that in the image playback device of the first embodiment, the time period discriminating means 2 is equipped with a flesh tone detection means 14 which receives moving-picture image information from the recorded information read out by  
10 the medium playback means 1, and detects flesh tone regions within the screen, and an absence-of-persons discriminating means 15 which discriminates periods of absence of persons in which the flesh tone regions detected by the flesh tone detection means 14 drop below a prescribed area, and by the  
15 fact that the playback display means 3 acquires the periods of absence of persons discriminated by the absence-of- persons discriminating means 15, and plays back and displays moving-picture image information contained in the recorded information only during these periods of absence of persons  
20 or during time periods other than these periods of absence of persons.

Figure 8 is a block diagram which illustrates the eighth embodiment of the invention.

The eighth embodiment is characterized by the fact that  
25 an electronic camera is equipped with an imaging means 16 which produces moving-picture image information by imaging an object via an imaging optical system L, an imaging

parameter detection means 17 which detects at least one imaging parameter of the imaging optical system L, a medium recording means 18 which inputs moving-picture image information produced by the imaging means 16 and imaging 5 parameters detected by the imaging parameter detection means 17, and records such moving-picture image information and imaging parameter on a recording medium R as recorded information, a medium playback means 1 which reads out the recorded information from the recording medium R, a time 10 period discriminating means 19 which receives at least one imaging parameter from the recorded information read out by the medium playback means 1, and discriminates time periods during which such imaging parameters agree with certain pre-set conditions, and a playback display means 3 which plays 15 back and displays moving-picture image information contained in the recorded information in accordance with the results of the discrimination performed by the time period discriminating means 19.

In one of its implementations, the eight embodiment is 20 characterized by the fact that in the electronic camera, the imaging parameter detection means 17 detects focal point adjustment conditions of the imaging optical system L as imaging parameters, the time period discriminating means 19 receives the focal point adjustment conditions from the 25 recorded information read out by the medium playback means 1, and discriminates out-of-focus periods in which the focal point adjustment conditions show an out-of-focus state, and

the playback display means 3 plays back and displays moving-picture image information contained in the recorded information only during time periods other than the out-of-focus periods detected by the time period discriminating

5 means 19.

In another of its implementations, the eighth embodiment is characterized by the fact that in the electronic camera, the imaging parameter detection means 17 detects the lens position inside a mirror tube of the 10 imaging optical system L as an imaging parameter, the time period discriminating means 19 receives the lens position from the recorded data read out by the medium playback means 1, and discriminates point-blank periods in which the lens position is at the point-blank (close distance) end, and the 15 playback display means 3 plays back and displays moving-picture image information contained in the recorded information only during time periods other than the point-blank periods discriminated by the time period discriminating means 19.

20 In another of its implementations, the eighth embodiment is characterized by the fact that in the electronic camera, the imaging parameter detection means 17 detects the lens position inside a mirror tube of the imaging optical system L as an imaging parameter, the time 25 period discriminating means 19 receives the lens position from the recorded data read out by the medium playback means 1, and discriminates periods of infinite distance in which

the lens position is at the infinite distance end, and the playback display means 3 plays back and displays moving-picture image information contained in the recorded information only during the periods of infinite distance

5 discriminated by the time period discriminating means 19 or during time periods other than the periods of infinite distance.

Figure 9 is a block diagram of the ninth embodiment of the invention.

10 The ninth embodiment is characterized by the fact that an electronic camera of this invention is equipped with an imaging means 16 which produces moving-picture image information by imaging an object via an imaging optical system L, an environmental parameter detection means 20 which detects at least one environmental parameter indicative of the surrounding environment at the time of imaging, a medium recording means 18 which inputs moving-picture image information produced by the imaging means 16 and environmental parameters detected by the environmental parameter detection means 20, and records such moving-picture image information and environmental parameters on a recording medium R as recorded information, a medium playback means 1 which reads out the recorded information from the recording medium R, a time period discriminating means 21 which receives the environmental parameters from the recorded information read out by the medium playback means 1, and discriminates time periods during which these

environmental parameters agree with certain pre-set conditions, and a playback display means 3 which plays back and displays moving-picture image information contained in the recorded information in accordance with the results of 5 the discrimination performed by the time period discriminating means 21.

Figure 10 is a block diagram which illustrates the tenth embodiment of the invention.

The tenth embodiment is characterized by the fact that 10 in the electronic camera of the ninth embodiment, the environmental parameter detection means 20 is equipped with an infrared radiation detection means 22 which detects infrared radiation from an imaged object field, and a temperature detection means 23 which detects the temperature 15 of the object in accordance with the infrared radiation detected by the infrared radiation detection means 22, and uses this temperature of the object as an environmental parameter, by the fact that the time period discriminating means 21 receives the temperature of the object from the 20 recorded information read out by the medium playback means 1, and discriminates periods in which the temperature of the object is within a predetermined temperature range, and the playback display means 3 plays back and displays moving-picture image information contained in the recorded 25 information only during the periods discriminated by the time period discriminating means 21 or during time periods

other than the periods discriminated by the time period discriminating means 21.

In the image playback device of Figure 1, recorded information is read out from the recording medium R via the medium playback means 1.

The time period discriminating means 2 discriminates this recorded information using pre-set conditions, and determines time periods in which the recorded information shows agreement with these conditions within the playback period of the recorded information.

The playback display means 3 plays back and displays moving-picture image information contained in the recorded information in accordance with the results of such a discrimination.

Furthermore, it is sufficient if the playback display means 3 used here is a means which produces an image output, etc., that is provided to an image display device; it is not necessary to include such an image display device itself.

In the image playback device of Figure 2, the time period discriminating means 2 is constructed from a sound quantity detection means 4 and a silence discriminating means 5.

This sound quantity detection means 4 inputs audio information from the recorded information, and detects the sound quantity of this audio information.

The silence discriminating means 5 discriminates silent periods in which the above-mentioned sound quantity drops below a predetermined sound quantity.

The playback display means 3 plays back and displays 5 moving-picture image information contained in the recorded information, with the above-mentioned silent periods omitted.

As a result of such an action, moving-picture image information can be played back and displayed with an 10 emphasis on conversational portions or narration portions contained in the recorded information. Accordingly, the operator can obtain a rough grasp of the contents of the recorded information (story or flow of conversation) without playing back the recorded information over the entire time 15 period of this recorded information.

In the image playback device of Figure 3, the time period discriminating means 2 is constructed from a speaker characteristic feature extracting means 6 and a speaker discriminating means 7.

20 The speaker characteristic feature extracting means 6 inputs audio information from the recorded information, and detects characteristic feature parameters (long-term spectrum averages or mean pitch frequencies) of this audio information.

25 The speaker discriminating means 7 discriminates periods in which these characteristic feature parameters

agree with registered characteristic feature parameters within a permissible range.

The playback display device 3 plays back and displays moving-picture contained in the recorded information only 5 during these periods of agreement.

As a result of such an action, moving-picture image information can be played back and displayed with an emphasis on conversations of specified speakers, etc., within the recorded information. Accordingly, the operator 10 can observe moving-picture image information with an emphasis on specified speakers.

In the image playback device of Figure 4, the time period discriminating means 2 is constructed from a brightness difference detection means 8 and a backlighting 15 discriminating means 9.

This brightness difference detection means 8 inputs moving-picture image information from the recorded information, and detects differences in the brightness level between central and peripheral portions of the image screen.

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The backlighting discriminating means 9 discriminates backlighting periods (in which imaging is performed in a backlit state) based on the brightness level differences.

The playback display means 3 plays back and displays 25 moving-picture image information contained in the recorded information, with the backlighting periods omitted.

As a result of such an action, moving-picture image information is played back and displayed with portions consisting of backlit imaging omitted. Accordingly, the operator can observe moving-picture image information with 5 periods of faulty imaging, etc., caused by backlighting omitted.

In the image playback device of Figure 5, the time period discriminating means 2 is constructed from a movement detection means 10 and a panning discriminating means 11.

10 The movement detection means 10 inputs moving-picture image information from the recorded information, and detects movement vectors between moving-picture frames.

15 The panning discriminating means 11 discriminates panning periods (in which the image screen as a whole moves horizontally) from the movement vectors.

The playback display means 3 plays back and displays moving-picture image information contained in the recorded information only during such panning periods or during time periods other than these panning periods.

20 Here, in cases where playback and display are performed only during panning periods, the operator can view moving-picture image information with an emphasis on scenes from car windows, etc.

25 On the other hand, in cases where playback and display are performed only during time periods other than panning periods, the operator can view moving-picture image information with unnecessary panning portions (generated

when scenes separated by a distance are connected), etc., excluded.

In the image playback device of Figure 6, the time period discriminating means 2 is constructed from a contrast 5 detection means 12 and a low-contrast discriminating means 13.

The above-mentioned contrast detection means 12 inputs moving-picture image information from the recorded information, and detects the contrast of this moving-picture 10 image information.

The low-contrast discriminating means 13 discriminates low-contrast periods in which the contrast drops below a predetermined threshold value.

The playback display means 3 plays back and displays 15 moving-picture image information contained in the recorded information, with the low-contrast periods omitted.

As a result of this action, moving-picture image information is played back and displayed with low-contrast portions omitted. Accordingly, the operator can view 20 moving-picture image information with low-contrast portions in which the main object of imaging is not present (as in images of blank walls, for example) omitted.

In the image playback device of Figure 7, the time period discriminating means 2 is constructed from a flesh 25 tone detection means 14 and an absence-of-persons discriminating means 15.

The flesh tone detection means 14 inputs moving-picture image information from the recorded information, and detects regions corresponding to flesh tones (hereafter referred to as "flesh tone regions") within the image screen.

5 The absence-of-persons discriminating means 15 discriminates periods of absence of persons in which the flesh tone regions drop below a prescribed area.

10 The playback display means 3 plays back and displays moving-picture image information contained in the recorded information only during such periods of absence of persons or during time periods other than these periods of absence of persons.

15 Here, in cases where playback and display are performed only during periods of absence of persons, the operator can view moving-picture image information with an emphasis on portions of the image information in which no persons are present, such as background images, etc.

20 On the other hand, in cases where playback and display are performed only during time periods other than the above-mentioned periods of absence of persons, the operator can view moving-picture image information with an emphasis on portions of the image information in which persons are imaged.

25 In the electronic camera of Figure 8, the imaging parameter detection means 17 detects imaging parameters which indicate the conditions of the imaging optical system L, etc., during imaging.

The medium recording means 18 records such imaging parameters on the recording medium R together with moving-picture image information.

At the time of playback, the time period discriminating 5 means 19 inputs at least one imaging parameter from the recorded information that is read out. The time period discriminating means 19 discriminates such imaging parameters using pre-set conditions, and determines time periods in which the parameters agree with these conditions 10 within the playback period of the recorded information.

The playback display means 3 plays back and displays moving-picture image information contained in the recorded information in accordance with the results of such a discrimination.

15 Furthermore, it is sufficient if the playback display means 3 used here is a means which produces an image output, etc., that is provided to an image display device; it is not particularly necessary to include such an image display device itself.

20 In one the implementations of the eighth embodiment, focal point adjustment conditions of the imaging optical system L are recorded together with moving-picture image information at the time of imaging.

The time period discriminating means 19 inputs the 25 focal point adjustment conditions from the recorded information, and discriminates out-of-focus periods in which

the focal point adjustment conditions show an out-of-focus state.

The playback display means 3 plays back and displays moving-picture image information only during time periods 5 other than such out-of-focus periods.

As a result of such an action, moving-picture image information is played back and displayed with out-of-focus portions omitted. Accordingly, the operator can view moving-picture image information with periods of faulty 10 imaging, etc., caused by improper focusing omitted.

Furthermore, in regard to the above-mentioned focal point adjustment conditions, it is possible to use either a numerical value which indicates the amount of defocusing, etc., or flag information which indicates whether or not an 15 out-of-focus state exists, etc.

In another implementation of the eighth embodiment, the lens position of the imaging optical system L is recorded together with moving-picture image information at the time of imaging.

20 At the time of playback, the time period discriminating means 19 inputs the lens position from the recorded information, and discriminates point-blank periods in which this lens position shows a position at the point-blank end.

The playback display means 3 plays back and displays 25 moving-picture image information only during time periods other than these point-blank periods.

As a result of such an action, moving-picture image information is played back and displayed with portions imaged under conditions in which the lens position of the imaging optical system L is at the point-blank end omitted.

5 Accordingly, moving-picture image information can be viewed with images of obstacles, etc., passing immediately in front of the electronic camera omitted.

In another implementation of the eighth embodiment, the lens position of the imaging optical system L is recorded 10 together with moving-picture image information at the time of imaging.

At the time of playback, the time period discriminating means 19 inputs the lens position from the recorded information, and discriminates periods of infinite distance 15 in which this lens position shows a position at the infinite distance end.

The playback display means 3 plays back and displays moving-picture image information only during such periods of infinite distance or during time periods other than such 20 periods of infinite distance.

Here, in cases where playback and display are performed only during the periods of infinite distance, the operator can view moving-picture image information with an emphasis on objects that are imaged at the infinite distance end, 25 such as scenery, etc.

On the other hand, in cases where playback and display are performed only during time periods other than the

periods of infinite distance, the operator can view moving-picture image information with objects of imaging that are imaged at the infinite distance end, such as scenery, etc., omitted.

5 In the electronic camera of Figure 9, the environmental parameter detection means 20 detects environmental parameters indicative of the surrounding environment at the time of imaging.

10 The medium recording means 18 records such environmental parameters on the recording medium R together with moving-picture image information.

15 At the time of playback, the time period discriminating means 21 inputs the environmental parameters from the recorded information that is read out. The time period discriminating means discriminates these environmental parameters using pre-set conditions, and determines periods in which these parameters show agreement with the above-mentioned conditions during the playback period of the recorded information.

20 The playback display means 3 plays back and displays moving-picture image information contained in the recorded information in accordance with the results of such a discrimination.

25 Furthermore, it is sufficient if the playback display means 3 used here is a means which produces an image output, etc., that is provided to an image display device; it is

not particularly necessary to include such an image display device itself.

In the electronic camera of Figure 10, the environmental parameter detection means 20 is constructed 5 from an infrared radiation detection means 22 and a temperature detection means 23.

The infrared radiation detection means 22 detects infrared radiation from the image field at the time of imaging.

10 The temperature detection means 23 detects a numerical value which is convertible into the surface temperature of the object (hereafter, this numerical value will be referred to as the "temperature of the object") based on the above-mentioned infrared radiation.

15 The medium recording means 18 records this temperature of the object on the recording medium R together with moving-picture image information.

At the time of playback, the time period discriminating means 21 inputs the temperature of the object from the 20 recorded information. The time period discriminating means 21 discriminates periods during which the temperature of the object is within a predetermined temperature range.

The playback display means 3 plays back and displays moving-picture image information contained in the recorded 25 information only during the periods discriminated by the time period discriminating means 21 or during time periods

other than the periods discriminated by the time period discriminating means 21.

As a result of such an action, moving-picture image information can be viewed with an emphasis on objects that 5 exhibit a temperature within a specified range, or on objects other than such objects.

Illustrative implementations of the invention will now be described.

Figure 11 is a block diagram which illustrates a first 10 illustrative implementation of the invention (corresponding to Figure 2).

Figure 12 is a perspective view which illustrates the external appearance of the present illustrative implementation of the invention.

15 In these figures, a disk drive part 33 in which an optical-magnetic recording medium 32 is mounted in a freely detachable manner is installed in the image playback device 31. This disk drive part 33 is connected to a micro-processor 35 via a system bus 34.

20 Furthermore, a memory 36, an image expansion part 37, a display memory 38, an audio D/A conversion part 39 and a sound quantity detection part 40a are individually connected to the system bus 34.

25 A liquid crystal display part 42 is connected to the display memory 38 via a liquid crystal driving circuit 41.

A speaker 44 is connected to the audio D/A conversion part 39 via an audio amplifier 43.

The output of the sound quantity detection part 40a is input into the micro-processor 35 via a silence discriminating part 45a.

Furthermore, a playback button 46 is installed in the 5 housing of the image playback device 31, and the output of this playback button 46 is input into the micro-processor 35.

Here, in regard to the correspondence between the invention shown in Figure 2 and the first illustrative 10 implementation of the invention shown in Figure 11, the medium playback means 1 corresponds to the disk drive part 33, the time period discriminating means 2 corresponds to the sound quantity detection part 40a and silence discriminating part 45a, and the playback display means 3 corresponds to the image expansion part 37, display memory 15 38, liquid crystal driving circuit 41 and the micro-processor 35.

The operation of the first illustrative implementation of the invention will be described with reference to Figures 20 11 through 13.

First, when the main power supply of the image playback device 31 is switched on, the micro-processor enters a waiting state until the playback button 46 is switched on.

When the playback button 46 is switched on (Figure 13 25 S1) in this state, the micro-processor 35 instructs the disk drive part 33 to read out image files.

The disk drive part 33 reads out image files from the optical-magnetic recording medium 32, and successively stores these image files in the memory 36 (Figure 13 S2).

Meanwhile, the micro-processor 35 resets the playback 5 frame numbers of the image files stored at prescribed addresses in the memory 36 (Figure 13 S3).

The sound quantity detection part 40a inputs audio information (recorded in synchronization with the images having the above-mentioned playback frame numbers) from the 10 image files at fixed intervals, and detects the sound quantity level of this audio information (Figure 13 S4).

The silence discriminating part 45a ascertains whether or not the above-mentioned sound quantity level has dropped below a predetermined threshold value (Figure 13 S5).

15 Here, if the sound quantity level exceeds the above-mentioned predetermined threshold value (NO side of Figure 13 S5), the micro-processor 35 instructs the image expansion part 37 to perform image expansion. The image expansion part 37 inputs moving-picture image information indicated by 20 the above-mentioned playback frame numbers from the image files, performs image expansion, and stores the information in the display memory 38 (Figure 13 S6).

The liquid crystal driving circuit 41 reads out the moving-picture image information in the display memory 38 at 25 the rate of every other frame period, and displays this information on the liquid crystal display part 42 (Figure 13 S7). In this case, audio information which is synchronized

with the moving-picture image information is played back together with the moving-picture image information by means of the audio D/A conversion part 39 and audio amplifier 43.

On the other hand, in cases where the sound quantity 5 level is below the above-mentioned predetermined threshold value (YES side of Figure 13 S5), the image expansion part 37 performs only intra-frame image expansion, and the resulting information is temporarily recorded in a working memory within the image expansion part 37 (Figure 13 S8).

.0 These intra-frame images are images obtained by intra-frame compression at fixed frame intervals within the moving-picture image information, and are images necessary for the image expansion of other images (images subjected to inter-frame compression).

15 Following the completion of such processing (Figure 13 S7 or S8), the micro-processor 35 advances the playback frame number by one step (Figure 13 S9).

Here, in cases where the playback of the moving-picture image information has not been completed (NO side of Figure 20 13 S10), the operation returns to the processing of Figure 13 S4, and the operations described above are repeated.

On the other hand, when the playback of moving-picture image information is completed to the last frame number (YES side of Figure 13 S10), the image file playback operation is 25 completed. Furthermore, at this time, the temporary recording of intra-frame images is also erased.

As a result of the above operation, image files are not played back and displayed in the case of silent periods in which the sound quantity level is below the above-mentioned threshold value; instead, only the playback frame numbers 5 increase at a high rate. Accordingly, moving-picture image information in time periods other than the above-mentioned silent periods can be selectively played back and displayed.

Furthermore, as a result of such playback and display, image files can be played back and displayed with an 10 emphasis on conversational portions or narration portions, etc., contained in the image files. Accordingly, the operator can obtain a quick grasp of the flow of stories or conversation, etc., without having to view all of the image files.

15 Figure 14 is a block diagram of a second illustrative implementation of the invention (corresponding to Figure 3).

The structural special features of the second illustrative implementation of the invention are as follows:

(1) A speaker characteristic feature extracting part 20 40b and a speaker discriminating part 45b are respectively installed instead of the sound quantity detection part 40a and silence discriminating part 45a shown in Figure 11.

(2) A speaker registration button 47 is installed in the housing of the image playback device 31, and the output 25 of this speaker registration button 47 is input into the speaker discriminating part 45b.

Constituent elements which are the same as constituent elements shown in Figure 11 are labeled with the same reference numbers in Figure 14, and a description of the construction of such elements is omitted here.

5       Here, in regard to the correspondence between the invention shown in Figure 3 and the second illustrative implementation of the invention shown in Figure 14, the medium playback means 1 corresponds to the disk drive part 33, the time period discriminating means 2 corresponds to  
10      the speaker characteristic feature extracting part 40b and speaker discriminating part 45b, and the playback display means 3 corresponds to the image expansion part 37, display memory 38, liquid crystal driving circuit 41 and the micro-processor 35.

15      The operation of the second illustrative implementation of the invention will be described with reference to Figures 14 and 15.

First, when the main power supply of the image playback device 31 is switched on, the micro-processor 35 enters a  
20      waiting state until the playback button 46 is switched on.

When the playback button 46 is switched on (Figure 15 S1) in this state, the micro-processor 35 instructs the disk drive part 33 to read out image files.

25      The disk drive part 33 reads out image files from the optical-magnetic recording medium 32, and successively stores these image files in the memory 36 (Figure 15 S2).

Meanwhile, the micro-processor 35 resets the playback frame numbers of the image files stored at prescribed addresses in the memory 36 (Figure 15 S3).

The speaker characteristic feature extracting part 40b  
5 inputs audio information (recorded in synchronization with the images having the above-mentioned playback frame numbers) from the image files in the memory 36 at fixed intervals, and detects universally known long-term spectrum averages (Figure 15 S4).

10 When the speaker registration button 47 is pressed in this state (Figure 15 S5), the speaker discriminating part 45b stores the detected long-term spectrum average data as registered data (Figure 15 S6).

15 Here, the speaker discriminating part 45b ascertains whether or not detected long-term spectrum average data agrees with the above-mentioned registered data within a permissible range (Figure 15 S 7). Furthermore, in cases where the registered data has not been registered, the speaker discriminating part 45b makes a uniform judgement of  
20 "agreement".

If characteristic feature parameters show agreement within a permissible range (YES side of Figure 15 S7), the micro-processor 35 instructs the image expansion part 37 to perform image expansion. The image expansion part 37 inputs  
25 moving-picture image information (indicated by playback frame numbers) from image files, performs image expansion,

and transfers the information to the display memory 38 (Figure 15 S8).

The liquid crystal driving circuit 41 reads out the moving-picture image information in the display memory 38 at 5 the rate of every other frame period, and displays this information on the liquid crystal display part 42 (Figure 15 S9). In this case, audio information which is synchronized with the moving-picture image information is played back together with the moving-picture image information by means 10 of the audio D/A conversion part 39 and audio amplifier 43.

In cases where the long-term spectrum average data does not agree with the registered data within the above-mentioned permissible range (NO side of Figure 15 S7), the image expansion part 37 expands only the intra-frame images 15 required for the image expansion of the preceding and following frames. This intra-frame image [information] is temporarily recorded in the image expansion part 37 (Figure 15 S10). Here, since the intra-frame images are not stored in the display memory 38, these images are not played back 20 and displayed.

After such processing (Figure 15 S9 or S10) has been completed, the micro-processor 35 advances the playback frame number by one step (Figure 15 S11).

Here, in cases where the playback of the moving-picture 25 image information has not been completed (NO side of Figure 15 S12), the operation returns to the processing of Figure 15 S4, and the operations described above are repeated.

On the other hand, when the playback of moving-picture image information is completed to the last frame number (YES side of Figure 15 S12), the image file playback operation is completed. Furthermore, at this time, the temporary 5 recording of intra-frame images is also erased.

As a result of the above operation, image files are not played back and displayed during time periods other than periods of conversation by specified speakers; instead, only the frame numbers change at a high rate. Consequently, 10 playback and display are performed with an emphasis on moving-picture image information corresponding to periods of conversation by specified speakers.

Accordingly, the operator can view moving-picture image information selectively, with an emphasis on conversation by 15 specified speakers.

Figure 16 is a block diagram of a third illustrative implementation of the invention (corresponding to Figure 4).

In structural terms, this third illustrative implementation of the invention is characterized by the fact 20 that a brightness difference detection part 40c and a backlighting discriminating part 45c are respectively installed instead of the sound quantity detection part 40a and silence discriminating part 45a shown in Figure 11.

Furthermore, constituent elements which are the same as 25 constituent elements shown in Figure 11 are labeled with the same reference numbers in Figure 16, and a description of the construction of such elements is omitted here.

Here, in regard to the correspondence between the invention shown in Figure 4 and the third illustrative implementation of the invention shown in Figure 16, the medium playback means 1 corresponds to the disk drive part 33, the time period discriminating means 2 corresponds to the brightness difference detection part 40c and backlighting discriminating part 45c, and the playback display means 3 corresponds to the image expansion part 37, display memory 38, liquid crystal driving circuit 41 and of the micro-processor 35.

The operation of the third illustrative implementation of the invention will be described with reference to Figures 16 and 17.

First, when the main power supply of the image playback device 31 is switched on, the micro-processor 35 enters a waiting state until the playback button 46 is switched on.

When the playback button 46 is switched on (Figure 17 S1) in this state, the micro-processor 35 instructs the disk drive part 33 to read out image files. The disk drive part 33 reads out image files from the optical-magnetic recording medium 32, and successively stores these image files in the memory 36 (Figure 17 S2).

Meanwhile, the micro-processor 35 resets the playback frame numbers of the image files stored at prescribed addresses in the memory 36 (Figure 17 S3).

Here, the micro-processor 35 instructs the image expansion part 37 to perform image expansion of intra-frame

images. The image expansion part 37 inputs intra-frame images indicated by the playback frame numbers from image files in the memory 36, and performs image expansion on these intra-frame images (Figure 17 S4).

5 The brightness difference detection part 40c inputs the intra-frame images following image expansion, and detects differences in the brightness level between central and peripheral portions of the image screen (Figure 17 S5).

10 The backlighting discriminating part 45c ascertains whether or not such brightness level differences exceed a predetermined threshold value (Figure 17 S6).

15 Here, in cases where the brightness level differences are less than the above-mentioned threshold value (NO side of Figure 17 S6), the micro-processor 35 instructs the image expansion part 37 to perform image expansion up to the point immediately preceding the next intra-frame image. The image expansion part 37 successively performs image expansion up to the next intra-frame image, and stores the resulting image information in the display memory 38 (Figure 17 S7).

20 The liquid crystal driving circuit 41 reads out the moving-picture image information in the display memory 38 at the rate of every other frame period, and displays this information on the liquid crystal display part 42 (Figure 17 S8). In this case, audio information which is synchronized 25 with the moving-picture image information is played back together with the moving-picture image information by means of the audio D/A conversion part 39 and audio amplifier 43.

When image expansion up to the point immediately preceding the next intra-frame image is completed in the image expansion part 37, the micro-processor 35 advances the playback frame number to the frame number of the next intra-frame image (Figure 17 S9).

In cases where the above-mentioned brightness level differences exceed the threshold value (YES side of Figure 17 S6), the playback and display processing (Figure 17 S7 and S8) is not performed. As a result, in Figure 17 S9, only the playback frame number is advanced to the frame number of the next intra-frame image.

In cases where the playback of moving-picture image information is not completed following the above series of operations (NO side of Figure 17 S10), the operation returns to the processing of Figure 17 S4, and the above operations are repeated.

On the other hand, when the playback of moving-picture image information is completed to the last frame number (YES side of Figure 17 S10), the image file playback operation is completed. Furthermore, at this time, the temporary recording of intra-frame images is also erased.

As a result of the above operation, image files are played back and displayed with backlighting periods (in which the brightness level difference exceeds the above-mentioned threshold value) omitted. Accordingly, the operator can view moving-picture image information with faulty imaging portions caused by backlighting omitted.

Figure 18 is a block diagram of a fourth illustrative implementation of the invention (corresponding to Figure 5).

In structural terms, this fourth illustrative implementation of the invention is characterized by the fact 5 that a movement detection part 40d and a panning discriminating part 45d are respectively installed instead of the sound quantity detection part 40a and silence discriminating part 45a shown in Figure 11.

Furthermore, constituent elements which are the same as 10 constituent elements shown in Figure 11 are labeled with the same reference numbers in Figure 18, and a description of the construction of such elements is omitted here.

Here, in regard to the correspondence between the invention shown in Figure 5 and the fourth illustrative 15 implementation of the invention shown in Figure 18, the medium playback means 1 corresponds to the disk drive part 33, the time period discriminating means 2 corresponds to the movement detection part 40d and panning discriminating part 45d, and the playback display means 3 corresponds to 20 the image expansion part 37, display memory 38, liquid crystal driving circuit 41 and of the micro-processor 35.

The operation of the fourth illustrative implementation of the invention will be described with reference to Figures 18 and 19.

25 First, when the main power supply of the image playback device 31 is switched on, the micro-processor 35 enters a waiting state until the playback button 46 is switched on.

When the playback button 46 is switched on (Figure 19 S1) in this state, the micro-processor 35 instructs the disk drive part 33 to read out image files. The disk drive part 33 reads out image files from the optical-magnetic recording medium 32, and successively stores these image files in the memory 36 (Figure 19 S2).

Meanwhile, the micro-processor 35 resets the playback frame numbers of the image files stored at prescribed addresses in the memory 36 (Figure 19 S3).

10 The movement detection part 40d acquires universally known movement vectors from the moving-picture image information indicated by the playback frame numbers (Figure 19 S4). These movement vectors consist of vector information which digitizes the movement in images between 15 frames when inter-frame compression of the moving-picture image information is performed. Since these movement vectors are also used for image expansion during playback, the vectors are assigned to moving-picture image information following compression, and are recorded.

20 The panning discriminating part 45d ascertains from the above-mentioned movement vectors whether or not the screen as a whole is in the process of parallel movement (Figure 19 S5).

Here, in cases where the screen as a whole is not 25 undergoing parallel movement (NO side of Figure 19 S5), the micro-processor 35 instructs the image expansion part 37 to perform image expansion. The image expansion part 37 inputs

the moving-picture image information indicated by the playback frame numbers from the image files, performs image expansion, and stores the resulting image information in the display memory 38 (Figure 19 S6).

5        The liquid crystal driving circuit 41 reads out the moving-picture image information in the display memory 38 at the rate of every other frame period, and displays this information on the liquid crystal display part 42 (Figure 19 S7). In this case, audio information which is synchronized  
10      with the moving-picture image information is played back together with the moving-picture image information by means of the audio D/A conversion part 39 and audio amplifier 43.

In cases where the screen as a whole is in the process of horizontal movement (YES side of Figure 19 S5), the image  
15      expansion part 37 expands only the intra-frame images, and the resulting image information is temporarily stored in a working memory contained in the image expansion part 37 (Figure 19 S8). These intra-frame images are used for image expansion of the preceding and following frames, and are not  
20      played back and displayed.

After such processing (Figure 19 S7 or S8) has been completed, the micro-processor 35 advances the playback frame number by one step (Figure 19 S19).

Here, in cases where the playback of the moving-picture  
25      image information has not been completed (NO side of Figure 19 S10), the operation returns to the processing of Figure 19 S4, and the operations described above are repeated.

On the other hand, when the playback of moving-picture image information is completed with frame number reaching the last number (YES side of Figure 19 S10), the image file playback operation is completed. Furthermore, at this time, 5 the temporary recording of intra-frame images is also erased.

As a result of the above operation, image files are played back and displayed with panning periods omitted. Accordingly, the operator can view moving-picture image 10 information with panning portions (inserted incidentally for the purpose of connecting scenes) omitted.

Figure 20 is a functional block diagram of a fifth illustrative implementation of the invention (corresponding to Figure 6).

15 In structural terms, this fifth illustrative implementation of the invention is characterized by the fact that a contrast detection part 40e and a low-contrast discriminating part 45e are respectively installed instead of the sound quantity detection part 40a and silence 20 discriminating part 45a shown in Figure 11.

Furthermore, constituent elements which are the same as constituent elements shown in Figure 11 are labeled with the same reference numbers in Figure 20, and a description of the construction of such elements is omitted here.

25 Here, in regard to the correspondence between the invention shown in Figure 6 and the fifth illustrative implementation of the invention shown in Figure 20, the

medium playback means 1 corresponds to the disk drive part 33, the time period discriminating means 2 corresponds to the contrast detection part 40e and low-contrast discriminating part 45e, and the playback display means 3 5 corresponds to the image expansion part 37, display memory 38, liquid crystal driving circuit 41 and the micro-processor 35.

The operation of the fifth illustrative implementation of the invention will be described with reference to Figures 10 20 and 21.

First, when the main power supply of the image playback device 31 is switched on, the micro-processor 35 enters a waiting state until the playback button 46 is switched on.

When the playback button 46 is switched on (Figure 21 15 S1) in this state, the micro-processor 35 instructs the disk drive part 33 to read out image files.

The disk drive part 33 reads out image files from the optical-magnetic recording medium 32, and successively stores these image files in the memory 36 (Figure 21 S2).

20 Meanwhile, the micro-processor 35 resets the playback frame numbers of the image files stored at prescribed addresses in the memory 36 (Figure 21 S3).

Here, the micro-processor 35 instructs the image expansion part 37 to perform image expansion on intra-frame 25 images. The image expansion part 37 inputs the intra-frame images indicated by the playback frame numbers from the

image files, and performs image expansion on these intra-frame images (Figure 21 S4).

The contrast detection part 40e inputs intra-frame images following image expansion, extracts the high-region 5 components of the space frequency, and detects the amount of contrast (Figure 21 S5).

The low-contrast discriminating part 45e ascertains whether or not this amount of contrast is less than a predetermined threshold value (Figure 21 S6).

10 Here, in cases where the amount of contrast exceeds the above-mentioned threshold value (NO side of Figure 21 S6), the micro-processor 35 instructs the image expansion part 37 to perform image expansion up to the point immediately preceding the next intra-frame image. The image expansion 15 part 37 successively performs image expansion up to the next intra-frame image, and stores the resulting image information in the display memory 38 (Figure 21 S7).

The liquid crystal driving circuit 41 reads out the moving-picture image information in the display memory 38 at 20 the rate of every other frame period, and displays this information on the liquid crystal display part 42 (Figure 21 S8). In this case, audio information which is synchronized with the moving-picture image information is played back together with the moving-picture image information by means 25 of the audio D/A conversion part 39 and audio amplifier 43.

When image expansion up to the point immediately preceding the next intra-frame image is completed in the

image expansion part 37, the micro-processor 35 advances the playback frame number to the frame number of the next intra-frame image (Figure 21 S9).

In cases where the above-mentioned amount of contrast 5 is less than the threshold value (YES side of Figure 21 S6), the playback and display processing (Figure 21 S7 and S8) is not performed. As a result, in Figure 21 S9, only the playback frame number is advanced to the frame number of the next intra-frame image.

10 In cases where the playback of moving-picture image information is not completed after the above series of operations has been completed (NO side of Figure 21 S10), the operation returns to the processing of Figure 21 S4, and the above operations are repeated.

15 On the other hand, when the playback of moving-picture image information is completed with frame number reaching the last number (YES side of Figure 21 S10), the image file playback operation is completed. Furthermore, at this time, the temporary recording of intra-frame images is also 20 erased.

As a result of the above operation, image files are played back and displayed with low-contrast periods (in which the amount of contrast is less than the above-mentioned threshold value) omitted. Accordingly, the 25 operator can view moving-picture image information with scenes of walls, etc. (in which the main objects are not imaged) omitted.

Figure 22 is a functional block diagram of a sixth illustrative implementation of the invention (corresponding to Figure 7).

In structural terms, this sixth illustrative 5 implementation of the invention is characterized by the fact that a flesh tone detection part 40f and an absence-of-persons discriminating part 45f are respectively installed instead of the sound quantity detection part 40a and silence discriminating part 45a shown in Figure 11.

10 Furthermore, constituent elements which are the same as constituent elements shown in Figure 11 are labeled with the same reference numbers in Figure 22, and a description of the construction of such elements is omitted here.

15 Here, in regard to the correspondence between the invention shown in Figure 7 and the sixth illustrative implementation of the invention shown in Figure 22, the medium playback means 1 corresponds to the disk drive part 33, the time period discriminating means 2 corresponds to the flesh tone detection part 40f and absence-of-persons 20 discriminating part 45f, and the playback display means 3 corresponds to the image expansion part 37, display memory 38, liquid crystal driving circuit 41 and the micro-processor 35.

25 The operation of the sixth illustrative implementation of the invention will be described with reference to Figures 22 and 23.

First, when the main power supply of the image playback device 31 is switched on, the micro-processor 35 enters a waiting state until the playback button 46 is switched on.

When the playback button 46 is switched on (Figure 23 5 S1) in this state, the micro-processor 35 instructs the disk drive part 33 to read out image files.

The disk drive part 33 reads out image files from the optical-magnetic recording medium 32, and successively stores these image files in the memory 36 (Figure 23 S2).

10 Meanwhile, the micro-processor 35 resets the playback frame numbers of the image files stored at prescribed addresses in the memory 36 (Figure 23 S3).

15 Here, the micro-processor 35 instructs the image expansion part 37 to perform image expansion on intra-frame images. The image expansion part 37 inputs the intra-frame images indicated by the playback frame numbers from the image files in the memory 36, and performs image expansion on these intra-frame images (Figure 23 S4).

20 The flesh tone detection part 40f inputs intra-frame images following image expansion, extracts image regions which resemble flesh tones (flesh tone regions), and counts the number of pixels in such flesh tone regions (Figure 23 S5).

25 The absence-of-persons discriminating part 45f ascertains whether or not the number of pixels of the above-mentioned flesh tone regions is less than a predetermined threshold value (Figure 23 S6).

Here, in cases where the number of pixels of the above-mentioned flesh tone regions exceeds the above-mentioned threshold value (NO side of Figure 23 S6), the micro-processor 35 instructs the image expansion part 37 to 5 perform image expansion up to the point immediately preceding the next intra-frame image. The image expansion part 37 successively performs image expansion up to the next intra-frame image, and stores the resulting image information in the display memory 38 (Figure 23 S7).

10 The liquid crystal driving circuit 41 reads out the moving-picture image information in the display memory 38 at the rate of every other frame period, and displays this information on the liquid crystal display part 42 (Figure 23 S8). In this case, audio information which is synchronized 15 with the moving-picture image information is played back together with the moving-picture image information by means of the audio D/A conversion part 39 and audio amplifier 43.

When image expansion up to the point immediately preceding the next intra-frame image is completed in the 20 image expansion part 37, the micro-processor 35 advances the playback frame number to the frame number of the next intra-frame image (Figure 23 S9).

In cases where the number of pixels of the flesh tone regions is less than the above-mentioned threshold value 25 (YES side of Figure 23 S6), the playback and display processing (Figure 23 S7 and S8) is not performed. As a

result, in Figure 23 S9, only the playback frame number is advanced to the frame number of the next intra-frame image.

In cases where the playback of moving-picture image information is not completed after the above series of 5 operations has been completed (NO side of Figure 23 S10), the operation returns to the processing of Figure 23 S4, and the above operations are repeated.

On the other hand, when the playback of moving-picture image information is completed with the frame number 10 reaching the last number (YES side of Figure 23 S10), the image file playback operation is completed. Furthermore, at this time, the temporary recording of intra-frame images is also erased.

As a result of the above operation, image files are 15 played back and displayed with periods of absence of persons (in which the flesh tone regions have less than a prescribed area) omitted.

Accordingly, the operator can view moving-picture image information with an emphasis on scenes in which persons are 20 imaged.

Figure 24 is a block diagram of a seventh illustrative implementation of the invention (corresponding to Figure 8).

In Figure 24, a camera part 51a is attached to the side surface of the main body of an electronic camera 51, and an 25 imaging lens 52 which focuses an image of the object of imaging is mounted in this camera part 51a.

The optical axis of the imaging lens 52 is bent within the camera part 51a, and the light-receiving surface of an imaging element 53 consisting of a CCD image sensor, etc., is installed on an extension of this optical axis.

5 The photoelectric output of the imaging element 53 is input via an A/D conversion part 54 into a video signal processing part 55 which performs a white balance adjustment and gamma correction, etc.

10 The output of the video signal processing part 55 is input into an image compression and expansion part 56 located within the main body; this image compression and expansion part 56 is connected with a micro-processor 58 via a system bus 57.

15 A memory 59, an audio D/A conversion part 60, a disk drive part 61, a display memory 62 and a focus control part 65 are connected to the above-mentioned system bus 57.

The output of the above-mentioned audio D/A conversion part 60 is input into a speaker 60b via an audio amplifier 60a.

20 Furthermore, an optical-magnetic recording medium 61a is mounted in a freely detachable manner in the disk drive part 61.

The display memory 62 is connected to a liquid crystal display part 64 via a liquid crystal driving circuit 63.

25 A focal point detection part 66 which detects the focal point adjustment conditions of the imaging lens 52, and a lens position detection part 68 which detects the lens

position of the imaging lens 52, are connected to the input terminals of the focus control part 65. Furthermore, a focus control motor 69 which moves the imaging lens forward and backward is connected to the output terminal of the

5 focus control part 65.

The focus control part 65 controls the focus by driving the focus control motor 69 in accordance with the amount of defocusing acquired from the focal point detection part 66.

A record button 51b, a playback button 51c and an  
10 extraction mode selection dial 51d are installed in the housing of the electronic camera 51, and the outputs of these operating parts are respectively input into the micro-processor 58.

Furthermore, in regard to the correspondence between  
15 the invention shown in Figure 8 and the seventh illustrative implementation of the invention shown in Figure 24, the imaging means 16 corresponds to the imaging element 53, the imaging parameter detection means 17 corresponds to the focal point detection part 66 and lens position detection part 68, the medium recording means 18 corresponds to the disk drive part 61, the time period discriminating means 19 corresponds to the micro-processor 58, the medium playback means 1 corresponds to the disk drive part 61, and the playback display means 3 corresponds to the image compression and expansion part 56, display memory 62, liquid crystal driving circuit 63 and the micro-processor 58.

The operation of the seventh illustrative implementation of the invention will be described with reference to Figures 24 through 26.

(Image Recording Operation)

5       First, when the main power supply is switched on, the electronic camera 51 enters a waiting state until the playback button 51c or record button 51b is switched on.

When the playback button 51c is switched on (Figure 25 S1) in this state, the micro-processor 58 performs the 10 operation indicated in Figure 26 S9 (which will be described later).

When the record button 51b is switched on (Figure 25 S2), the micro-processor 58 instructs the image compression and expansion part 56 to begin image compression. The image 15 compression and expansion part 56 inputs moving-picture image information from the video signal processing part 55, and performs image compression processing according to the MPEG standard (Figure 25 S3).

In parallel with such image compression, the micro-processor 58 inputs the lens position and amount of defocusing of the imaging lens 52 via the focus control part 20 65 (Figure 25 S4 and S5).

The disk drive part 61 records the above-mentioned moving-picture image information, lens position and amount 25 of defocusing together in image files on the optical-magnetic recording medium 61a (Figure 25 S6).

In this state, the micro-processor 58 returns to Figure 25 S3, and the above-mentioned recording operation is repeated (NO side of Figure 25 S7) until the record button 51b is pressed again.

5 When the record button 51b is pressed again (YES side of Figure 25 S7), the micro-processor 58 returns to Figure 25 S1 after performing final processing such as the addition of control data (e. g., date and time data, etc.) to the image file in preparation (Figure 25 S8), so that the 10 recording operation is completed.

(Playback Operation)

When the playback button 51c is switched on (Figure 25 S1) in the above-mentioned waiting state, the micro-processor 58 instructs the disk drive part 61 to read out 15 image files. The disk drive part 61 reads out image files from the optical-magnetic recording medium 61a, and successively stores these files in the memory 59 (Figure 26 S9).

Next, the micro-processor 58 inputs the dial state of 20 the extraction mode selection dial 51d (Figure 26 S10), and performs the following operations in accordance with this dial state (Figure 26 S11).

First, in cases where the dial state is "infinitely distant end deletion mode", the micro-processor 58 inputs 25 the lens position information from the image files in the memory 59 in playback order (Figure 26 S12). Here, moving-picture image information which is synchronized with the

lens position information is played back and displayed (Figure 26 S14) only in cases where the lens position is not at the infinitely distant end (Figure 26 S13).

Furthermore, in cases where the dial state is "point-blank end deletion mode", the micro-processor 58 inputs the lens position information from the image files in the memory 59 in playback order (Figure 26 S15). Here, moving-picture image information which is synchronized with the lens position information is played back and displayed (Figure 26 S17) only in cases where the lens position is not at the point-blank end (Figure 26 S16).

Moreover, in cases where the dial state is "out-of-focus deletion mode", the micro-processor 58 inputs information indicating the amount of defocusing from the image files in the memory 59 in playback order (Figure 26 S18). Here, moving-picture image information which is synchronized with the lens position information is played back and displayed (Figure 26 S20) only in cases where the amount of defocusing is within the "focused" range (Figure 26 S19).

In cases where the playback of moving-picture image information is not completed after the above series of operations has been completed (NO side of Figure 26 S21), the operation returns to the processing of Figure 26 S10, and the above operations are repeated.

On the other hand, when the playback of moving-picture image information is completed (YES side of Figure 26 S21), the image file playback operation is completed.

As a result of the above operations, image files are 5 selectively played back and displayed in accordance with the conditions of the imaging lens 52 at the time of imaging. Accordingly, the operator can appropriately extract and view playback scenes in accordance with the conditions of the imaging lens 52.

10 Figure 27 is a block diagram of a seventh illustrative implementation of the invention (corresponding to Figures 9 and 10).

In Figure 27, a camera part 71a is attached to the side 15 surface of the main body of an electronic camera 71, and an imaging lens 72 which focuses an image of the object is mounted in this camera part 71a.

The optical axis of the imaging lens 72 is bent within the camera part 71a, and the light-receiving surface of an 20 imaging element 73 consisting of a CCD image sensor, etc., is installed on an extension of this optical axis.

The photoelectric output of the imaging element 73 is input via an A/D conversion part 74 into a video signal processing part 75 which performs a white balance adjustment and gamma correction, etc.

25 The output of the video signal processing part 75 is input into an image compression and expansion part 76 located within the main body; this image compression and

expansion part 76 is connected with a micro-processor 78 via a system bus 77.

A memory 79, an audio D/A conversion part 80, a disk drive part 81, a display memory 82 and an imaging object 5 temperature detection part 85 are connected to the above-mentioned system bus 77.

The output of the above-mentioned audio D/A conversion part 80 is input into a speaker 80b via an audio amplifier 80a.

10 Furthermore, an optical-magnetic recording medium 81a is mounted in a freely detachable manner in the disk drive part 81.

The display memory 82 is connected to a liquid crystal display part 84 via a liquid crystal driving circuit 83.

15 An infrared imaging element 87 equipped with an infrared optical system 86 is connected to the input terminal of the imaging object temperature detection part 85. Furthermore, an infrared imaging element of the thermal type or quantum type, etc., is used as the above-mentioned 20 infrared imaging element 87.

A record button 71b and a playback button 71c are installed in the housing of the electronic camera 71, and the outputs of these operating parts are input into the micro-processor 78.

25 Furthermore, in regard to the correspondence between the inventions shown in Figures 9 and 10 and the eighth illustrative implementation shown in Figure 27, the imaging

means 16 corresponds to the imaging element 73, the environmental parameter detection means 20 corresponds to the infrared optical system 86, infrared imaging element 87 and imaging object temperature detection part 85, the medium recording means 18 corresponds to the disk drive part 81, the time period discriminating means 21 corresponds to the micro-processor 78, the medium playback means 1 corresponds to the disk drive part 81, and the playback display means 3 corresponds to the image compression and expansion part 76, display memory 82, liquid crystal driving circuit 83 and the micro-processor 78.

The operation of the eighth illustrative implementation of the invention will be described with reference to Figures 27 and 28.

15 (Image Recording Operation)

First, when the main power supply is switched on, the electronic camera 71 enters a waiting state until the playback button 71c or record button 71b is switched on.

20 When the playback button 71c is switched on (Figure 28 S1) in this state, the micro-processor 78 performs the operation indicated in Figure 26 S8 (which will be described later).

When the record button 71b is switched on (Figure 28 25 S2), the micro-processor 78 instructs the image compression and expansion part 76 to begin image compression. The image compression and expansion part 76 inputs moving-picture

image information from the video signal processing part 75, and performs image compression processing according to the MPEG standard (Figure 28 S3).

In parallel with such image compression, the micro-

5 processor 78 instructs the imaging object temperature detection part 85 to detect the temperature of the object.

The object temperature detection part 85 detects infrared radiation from the image field via the infrared imaging element 87, and determines the temperature of the object of

10 (Figure 28 S4).

The disk drive part 81 records the above-mentioned moving-picture image information and object temperature together in image files on the optical-magnetic recording medium 81a (Figure 28 S5).

15 In this state, the micro-processor 78 returns to Figure 28 S3, and the above-mentioned recording operation is repeated (NO side of Figure 28 S6) until the record button 71b is pressed again.

When the record button 71b is pressed again (YES side 20 of Figure 28 S6), the micro-processor 78 returns to Figure 28 S1 after performing final processing such as the addition of control data (e. g., date and time data, etc.) to the image file in preparation (Figure 28 S7), so that the recording operation is completed.

25

(Playback Operation)

When the playback button 71c is switched on (Figure 28 S1) in the above-mentioned waiting state, the micro-processor 78 instructs the disk drive part 81 to read out image files. The disk drive part 81 reads out image files 5 from the optical-magnetic recording medium 81a, and successively stores these files in the memory 79 (Figure 28 S8).

Next, the micro-processor 78 inputs object temperature information from the image files in the memory 79 in 10 playback order (Figure 28 S9).

Here, the micro-processor 78 ascertains whether or not the temperature of the object is in the range of 30 to 40°C, which is the body temperature range of a human being (Figure 28 S10).

15 In cases where the temperature of the object is in the above-mentioned body temperature range (YES side of Figure 28 S10), the micro-processor 78 instructs the image compression and expansion part 76 to perform image expansion. The image compression and expansion part 76 20 inputs moving-picture image information synchronized with imaging object temperature information from the image files in the memory 79, performs image expansion on this moving-picture image information, and records the resulting image information in the display memory 82. The liquid crystal 25 driving circuit 83 inputs the moving-picture image information from the display memory 82 in order, and

displays this image information on the liquid crystal display part 84 (Figure 28 S11).

In cases where the temperature of the object is outside the above-mentioned body temperature range (NO side of 5 Figure 28 S10), playback and display are not performed as described above.

In cases where the playback of moving-picture image information is not completed after the above series of operations has been completed (NO side of Figure 28 S12), 10 the operation returns to the processing of Figure 28 S9, and the above operations are repeated.

On the other hand, when the playback of moving-picture image information is completed (YES side of Figure 28 S12), the image file playback operation is completed.

15 As a result of the above operations, image files are selectively played back and displayed only in cases where the temperature of the object is in the human body temperature range. Accordingly, the operator can view moving-picture image information with an emphasis on scenes 20 in which human beings are imaged.

In the illustrative implementation of the inventions described above, periods meeting certain conditions were discriminated, and image information was played back and displayed only during these periods. However, the present 25 invention is not limited to such a construction; it would also be possible to perform such playback and display only during time periods other than the discriminated periods.

In the illustrative implementation of the inventions described above, only cases in which partial playback was performed automatically were described in order to simplify the description. However, the present invention is not limited to such a construction; for example, it would also be possible for the operator to determine whether or not partial playback is performed by operating a switch, etc.

In the illustrative implementation of the inventions other than the seventh illustrative implementation of the invention, periods were discriminated based on a single condition. However, the present invention is not limited to such a construction; for example, it would also be possible to install discriminating means for a plurality of conditions beforehand, with the operator selecting desired conditions by operating switches, etc. Also, it would also be possible to set prescribed logical operations (logical products, logical sums, etc.) for a plurality of conditions, and to discriminate periods based on composite conditions answering to these logical operations. For example, in a case where periods are discriminated based on the logical product of panning discrimination and absence-of-persons discrimination, moving-picture image information can be played back and displayed with an emphasis on "car window scenery with persons absent", etc. Furthermore, fuzzy logic, etc., can also be employed in such logical operations.

In the illustrative implementation of the inventions described above, an optical-magnetic recording medium was used as the recording medium; however, the present invention is not restricted in terms of the form or material 5 of the recording medium used. For example, semiconductor recording media, magnetic recording media or optical recording media, etc., may also be used as recording media.

In the second illustrative implementation of the invention, long-term spectrum averages were used as audio 10 characteristic feature parameters; however, the present invention is not limited to such a construction. Any waveform or value which indicates characteristic features of voices, e. g., mean pitch frequency, etc., may be used as a characteristic feature parameter.

15 While preferred embodiments and implementations of the invention have been shown and described, it will be apparent to those skilled in the art that changes can be made in these embodiments and implementations without departing from the principles and spirit of the invention, the scope of 20 which is defined in the appended claims.